

Mood ratings and physical activity among patients in cardiac rehabilitation

Research Thesis

Presented in partial fulfillment of the requirements for graduation *with research distinction* in
Psychology in the undergraduate colleges of The Ohio State University

by

Jacob Landers

The Ohio State University

May 2014

Project Advisor: Dr. Charles Emery, Department of Psychology

INTRODUCTION

Cardiovascular disease (CVD) is a serious health problem affecting millions of Americans each year. CVD is defined by the American Heart Association (AHA) as “heart and blood vessel disease” (AHA, 2011) and is a term used to cover the different diseases that affect the heart or blood vessels around it. Some major types of CVD include hypertension, coronary heart disease, and coronary artery disease. According to the Centers for Disease Control and Prevention (CDC), CVD is the leading cause of death in the United States, and is accountable for one out of every four deaths (CDC, 2013). While CVD can kill, there are also millions living with the disease and its various effects, such as cardiomyopathy and arrhythmias (CDC, 2012).

There are several risk factors to consider when examining trends in CVD. One that cannot be changed by the individual is heredity. According to the CDC, genetics can play a key role in a number of CVD contributors like high blood pressure and heart disease (CDC, 2009). In other words, those with specific genetic profiles may be more pre-disposed to developing CVD. Other factors like age, race, and gender also cannot be controlled by the individual but may contribute to increased chances of developing CVD. For example, one in four women who suffer from a heart attack will die within the first year after the heart attack compared with one in five men. Additionally, African American men were 30% more likely to die from heart disease than non-hispanic caucasian men. Also, although CVD risk factors typically increase with age, younger individuals are at risk of CVD too; over 150,000 people under the age of 65 died of heart disease in 2009 (Million Hearts, 2013).

The risk factors that can in fact be controlled by the individual are behavioral in nature and include, but are not limited to: alcohol and tobacco use, physical inactivity, diet, obesity, and

psychological stress (CDC, 2009). Approximately 49% of adults in the United States have at least one major risk factor for heart disease and stroke. According to a 2006 report from the Million Hearts organization, 39.5% of U.S. adults possessed the “inactivity” risk factor, 33.9% possessed the “obesity” risk factor, and 20.8% possessed the “smoker” risk factor (Million Hearts, 2013). These are all behavioral risk factors that can contribute to the development of CVD and other diseases. The ideal way to control behavioral risk factors is through primary prevention, including diet and exercise to manage the modifiable risk factors such as inactivity and obesity. There are also smoking cessation programs that help smokers learn how to quit smoking and curb their cravings for tobacco.

When individuals develop CVD, whether due to genetics or behavioral factors, secondary prevention must be utilized. One form of secondary prevention that seeks to help heal those suffering from CVD is cardiac rehabilitation (CR). The AHA defines CR as a program that is supervised by professionals serving to help people recover from heart surgery, heart attacks, and other heart problems. Positive changes resulting from attending CR include strengthening of the heart and body, improved diet, weight loss, and other physical and psychological benefits (AHA, 2011). CR patients are not only counseled and educated about their condition/lifestyle choices, but are also supervised in an exercise program to help increase physical endurance and improve cardiovascular function despite having CVD (AHA, 2011). Physical activity is the primary focus of CR and can be a key factor in leading to positive outcomes.

While there are many benefits of CR, they can only be achieved when patients attend regularly. A 2012 study by Herber, Johnston, Jones, and Smith sought to find the source of non-attendance of cardiac patients and found that a number of factors played a role, such as cardiac-

related beliefs, mood, and motivation. According to the researchers, 30-60% of cardiac patients do not attend CR, suggesting that the impact of these factors on cardiac patients can be profound (Herber, Johnston, Jones, & Smith, 2012).

In addition to cardiac-related beliefs, mood, and motivation, there are a number of other barriers that can have a negative effect on CR participation. If the patient lives in a rural area there may not be a CR facility located within their travel range. Additionally, the cost of health care can be a major barrier to entering a CR program; the cost of treating CVD can be high and patients may choose not to participate in CR to save costs. Often patients have work or home responsibilities as well that act as barriers to participating in CR (AHA, 2013).

Barriers to CR participation can often be the same factors that contributed to the development of CVD. One such factor is the influence of depression and other mood disorders. According to the CDC, depressive disorders and specific mood patterns can be linked to cardiovascular disease (CDC, 2011). Not only is depression a risk factor for CVD, but, as suggested by Herber et al (2012), the effect of depression can extend into the CR stage, damaging recovery of patients by reducing the patient's likelihood of attending CR. These findings indicate the importance of identifying factors influencing patient mood because of the serious impact on CR attendance and CVD outcome.

Since identifying patient moods is such an important part of CR and CVD outcome, mood has been one psychological focus of heart disease research. Research has documented changes in mood as a result of CR participation. For example, Yohannes, Doherty, Bundy, & Yalfani (2010) studied effects of an outpatient CR program on self-reported exercise, anxiety, and depression. Results indicated that the six-week CR program was beneficial up to one year

after completion of CR. In particular, depression and anxiety scores improved, as did physical activity levels and overall quality of life scores (Yohannes, Doherty, Bundy, & Yalfani, 2010). These findings are useful in that they point out key areas that may be improved by the completion of CR: depression, anxiety, physical activity, and quality of life. In turn, this information that could be used to encourage CVD patients to participate in CR.

However, there is still the question of specific factors that may influence depressive and anxious mood, and, in turn, help encourage cardiac patients to attend CR. It seems that a potential answer to this question may lie in physical activity level. Barnum tracked the emotional responses of 140 cardiac patients throughout CR and found lower anxiety and depression scores as CR progressed, especially in the first four weeks of CR (Barnum, 2011). These findings further reinforce those of Yohannes et al, and may help in selling CR to cardiac patients. Not only will exercise help strengthen the heart, but it may also help alleviate some of the depression and anxiety patients suffer from.

One important measure during CR exercise is the degree of physical exertion experienced by the patient. Although the patient should not over-exert themselves, it is also important that the exercise being performed by patients is challenging them; without a challenge, little physical progress would be made from CR participation. Therefore, a consistent scale is needed for measuring the exertion being experienced by patients. The Borg Rating of Perceived Exertion Scale (RPE) is a scale used to measure the strain one is experiencing from physical activity (CDC, 2011). RPE is highly correlated with heart rate during physical activity, which makes this scale particularly useful in CR studies (CDC, 2011). Use of the scale helps patients avoid

excessive strain and possible self-harm. It is also useful for tracking whether activities become increasingly easier or harder for patients during participation in CR.

RPE provides a subjective indicator reflecting both physical fitness and fatigue in the self-rated exertion associated with various activities. A meta-analysis in 2006 by Puetz, Beasman, & O'Conner evaluating studies of CR between 1945 and 2005 found that energy and fatigue were less studied by researchers than were factors such as depression and anxiety. Findings also revealed moderately large effect sizes for increased energy and decreased fatigue in patients following CR (Puetz, Beasman, & O'Conner, 2006).

Among both depressed and non-depressed patients in a CR program, Doe (2010) found that functional status improved and RPE decreased following participation; These findings suggest that energy and fatigue ratings are important factors to consider when analyzing the success of CR programs. Both the meta analysis by Puetz, Beasman, & O'Conner as well as the study by Doe found that RPE decreased after CR participation. However, previous studies have not examined the degree to which mood and cardiopulmonary fitness are associated with RPE or with changes in RPE during CR. This study was designed to address the gap in the research literature.

HYPOTHESES

The following four hypotheses were evaluated in this study: (1) Exercise during CR will be associated with improved mood ratings from baseline (T1) to follow up testing at the end of CR (T2); (2) RPE will be reduced during fitness testing between T1 and T2; (3) Increased cardiopulmonary fitness during CR will be associated with improved mood and reduced RPE; (4) Improved mood during CR will be associated with reduced RPE.

METHOD

Participants and Recruitment

Sixty participants were recruited from both The Ohio State University Hospital East's CR program and the CR program at the Center for Wellness and Prevention located at OSU's Martha Morehouse Medical Plaza. Of the 60 patients recruited, 38 participants completed both T1 and T2 assessments. The mean age of participants was 57.9 ± 11.8 years. Additionally, there were 11 female participants and the mean education of all participants was a 14 years. Additional demographic reports can be found in Table 1. Participants were eligible for the study as long as they met the following guidelines: over 18 years of age, can speak and read English, and have been referred to a CR program due to the diagnosis of a cardiac condition. In order to recruit participants, the offer to be a part of the study was made directly in person during CR orientation sessions. At that time, the study procedures and expectations were also explained.

PROCEDURE

Patients who agreed to take part in the study and met the required criteria for being a participant completed the informed consent. After this form was turned in, participants were scheduled for their first assessment (T1) typically within one week of the start of the CR program. For the first assessment, participants completed a packet of questionnaires requiring approximately 30 minutes. This questionnaire packet was given to the participant a few days prior so that they could turn it in on the day of their fitness assessment. In addition, participants agreed to allow access to CR medical records. The fitness assessment included an evaluation of exercise capacity utilizing a 60-foot walk test and a 6-minute walk test, with various objective and subjective self-report measurements taken throughout the tests.

After the T1 assessment, participants completed the CR program at one of the Ohio State outpatient CR centers. The program included 36 telemetry-monitored exercise sessions usually spread out over 12 weeks. Patients were also able to attend weekly education classes as a part of the program in order to better understand CVD. Each exercise session included 5-10 minutes of stretching, 20-30 minutes of aerobic exercise (treadmill, stairmaster, bicycle ergometer, and arm ergometer), 5-10 minutes of light weightlifting, and 5-10 minutes of cool-down stretching. There were ten weekly education classes during CR lasting 30 minutes each which covered topics such as nutrition, stress management, fitness, smoking cessation, weight loss/management, coping, and medication review. The classes were taught by exercise physiologists, dietitians, nurses, or health psychology graduate students.

After all CR was completed, participants were asked to return for a follow-up assessment (T2). This assessment took place the week of their last CR session. The date of the T2 assessment was generally approximately three months after T1, following 36 CR sessions. Participants completed the same questionnaire packet that was completed at T1. The T2 fitness assessment included an evaluation of exercise capacity identical to the T1 assessment, consisting of the 60-foot walk test and 6-minute walk test.

WALK TESTING

Upon arrival for the assessment, the participant's weight, blood pressure, and any medications taken that day (specifically beta-blockers) were recorded. Participants then provided self-report ratings of pre-test shortness of breath, fatigue, and the RPE. Shortness of breath and fatigue were measured on a scale ranging from 0 (no shortness of breath or fatigue) to 10 (maximal shortness of breath or fatigue). The RPE scale ranged from 6 (no exertion) to 20

(maximal exertion). In addition, the participant's pre-test resting heart rate and pre-test oxygen saturation were measured with a pulse oximeter and recorded.

After the pre-test measurements were recorded, participants were prepped for the 60-foot walk test. For this test, two cones were placed 15 feet apart in a hallway with a level floor. Participants were asked to walk two laps around the cones equaling a total distance of 60 feet. Participants were reminded to walk around cones in a smooth walking motion, not to stop or hesitate when turning around the cones. They were also reminded not to run, but complete the task in as short a time as possible at a comfortable pace. A demonstration was given to the participants so that they fully understood the procedure. A stopwatch was used to record the amount of time it took participants to complete the two laps.

After completion of the 60-foot walk test, the participant's heart rate, oxygen saturation, shortness of breath rating, fatigue rating, and RPE were recorded again along with the time it took them to complete the 60-foot walk test. Before continuing to the 6-minute walk test, the participant's heart rate, oxygen saturation, fatigue, shortness of breath, and RPE had to return to baseline (pre-60-foot walk test level). In order for this to happen, participants were given a few minutes to rest before proceeding to the 6-minute walk test. During the rest time the cones were rearranged for the 6-minute walk test by placing them 60 meters apart in the assessment hallway. Again, participants were asked to walk smoothly around the cones as they did for the 60-foot walk test. They were reminded that the goal of the 6-minute walk test was to walk as far as possible in the 6 minutes allowed without running or jogging, and that there was no required distance for their assessment. Participants were also reminded that it is a longer assessment and they may become fatigued, in which case they may slow down or stop if necessary to rest,

including the option to rest against the wall; if they are able to continue the assessment they should do so as soon as they feel able to. A demonstration was given so that the participants understood the procedure.

Before the 6-minute walk test and after they had rested enough from the 60-foot walk test, the participant's pre-test heart rate, oxygen saturation, shortness of breath rating, fatigue rating, and RPE were measured again and recorded. This was done to ensure that participants had rested long enough to reach baseline levels recorded prior to the 60-foot walk test. In addition, participants were asked to rate their confidence in their ability to walk for 6 minutes without stopping on a scale from 0% to 100%.

After participants started the 6-minute walk they were alerted after each minute so they knew how much time remained in the walk test. The number of laps the participants completed was recorded. After two minutes and four minutes of walking, participants were asked to give their RPE while they continued to walk. When the timer reached 15 seconds remaining, the participant was notified that the assessment was about to end. When there was no time remaining, the participant was asked to stop where they were so that their current spot in the hallway could be marked and an accurate completed distance measurement could be made. When the participants stopped, they provided post-test ratings of shortness of breath, fatigue, and RPE. Their heart rate and oxygen saturation were recorded as well.

Participants were given \$10 after the completion of each questionnaire and an additional \$10 for the completion of each assessment. It was expected that the questionnaire packets would take approximately 30 minutes each to complete and that each fitness assessment would take

approximately 30-60 minutes to complete. Participants were permitted to leave the study at any time they wished with no penalty or loss of benefits.

QUESTIONNAIRE MEASUREMENTS

Demographic Questionnaire

Participants provided demographic information including age, ethnicity, marital status, living arrangements, current work status, family income, and education level.

Measures of Distress

Distress, Depression & Anxiety: The Hospital Anxiety and Depression Scale (HADS), was utilized to measure distress. It was developed by Zigmond & Snaith in 1983 and consists of 14 questions. These questions are designed to assess anxiety and depression among non-psychiatric medical patients. There are two sub-scales: depression (HADS-D) and anxiety (HADS-A) which contain seven items each. The depression sub-scale includes questions concerning the respondent's feelings about various topics such as enjoyment of things they used to enjoy, cheerfulness, and loss of interest. The anxiety sub-scale includes questions concerning the respondent's ability to feel relaxed, amount of worry going through the mind, and panic. Respondents rated each item on a scale from 0 (not at all) to 3 (most of the time). There is a possible range of scores from 0-21 for each sub-scale of the HADS, and in each sub-scale a score above 10 indicates clinically significant stress. Distress (HADS total) is measured by respondent scores of anxiety and depression combined, with a score ranging from 0-42.

DATA ANALYSIS

Two approaches to data analysis were used: paired samples t-tests and Pearson Correlations. The paired samples t-tests were used to evaluate change in the outcome variables

measured during completion of the questionnaire packets and fitness assessments. Pearson Correlations were used to measure the significance of the associations among various outcome measures and fitness assessment variables.

RESULTS

T-tests indicated significant changes among participants between T1 and T2. Participants reported a significant decrease in distress (11.23 to 8.87, $p = .002$, $t(38) = 3.36$). Participants also reported a significant decrease in anxiety (6.86 to 5.54, $p = .018$, $t(35) = 2.49$). However, there was no change in depression (4.37 to 3.89), as shown in Table 2.

Six minute walk test performance significantly improved between T1 and T2 (426.31 meters to 455.01 meters, $p < .0001$, $t(38) = 4.76$). There was no change in sixty-foot walk test performance (19.43 seconds to 18.72 seconds). However, pre 60-foot walk test RPE decreased between T1 and T2 (7.23 to 6.39, $p = .014$, $t(38) = 2.59$). Additionally, pre 6-minute walk test RPE decreased from T1 to T2 (6.90 to 6.32, $p = .026$, $t(38) = 2.33$), as shown in Table 2.

Correlational analyses indicated that pre 60-foot walk test RPE was associated with T1 distress on the HADS ($r = .29$, $p = .030$) and T1 depression ($r = .29$, $p = .034$), but not T1 anxiety. Additionally, change in pre 60-foot walk test RPE from T1 to T2 was associated with T1 distress ($r = .36$, $p = .027$) and T1 depression ($r = .33$, $p = .044$), with a trend toward significance for anxiety ($r = .31$, $p = .062$). Pre-60ft walk test shortness of breath and fatigue at T1 as well as change in pre-60ft walk test shortness of breath and fatigue from T1 to T2 were not associated with distress, anxiety, or depression, as shown in Table 3. Pre 6-minute walk test measures of RPE, fatigue, and shortness of breath at T1 as well as the change in those pre 6-minute walk test measures from T1 to T2 were not associated with T1 distress, anxiety, or depression.

SUMMARY

There were a number of improvements observed among participants in both physical functioning and psychological functioning during the course of CR. Participant functional status measured by the six minute walk test improved significantly after CR by an average of 28.7 meters. Also, participants were significantly less distressed and anxious according to their HADS reports after CR, supporting hypothesis one. These results are important in that they replicate previous research on the positive effects of CR, and can be used to further solidify selling points of CR for both referring cardiologists and cardiac patients. Participants reported lower resting exertion levels (measured before the 60-foot walk test and six minute walk test) after CR than they did before CR, supporting hypothesis two. This result is very important in that it shows patient resting exertion can decrease following CR participation. Correlational analyses revealed that higher distress and depression was associated with higher resting RPE before the 60ft walk test when participants came in for fitness testing, but elevated distress and depression scores at baseline were associated with greater reductions in this resting RPE from T1 to T2. Although this was contrary to hypothesis four, which hypothesized that better mood would be associated with reduced RPE, it is possible that this reflects regression to the mean. This would be an interesting area for further research.

CONCLUSIONS

This study reveals many positive outcomes of CR participation. Some of those have been replicated in prior studies, but other results are novel. These results offer additional evidence in support of CR participation. This study also highlights a possible area for CR intervention. Functional status, exertion levels, distress, and anxiety all were shown to be improved after CR.

However, the correlational analyses show that patients with greater distress and depression at entry into CR will likely experience greater exertion than those with lower distress and depression. This feeling of extra exertion could lead patients to be less likely to push themselves during CR for fear of over-exerting or harming themselves. If patients feel too exerted at the beginning of CR, when exercise is typically lighter in difficulty, they may feel discouraged and be less likely to return to CR as well. If they do not exert themselves fully or dropout of the CR program, there is greater risk of suffering from another cardiac episode, or at the very least not taking positive steps toward improving their condition. Thus, patient distress and depression should be addressed early in the CR program so that patients are able to safely exert themselves fully and benefit from all that the CR program has to offer.

TABLES

Table 1	
<i>Participant Demographics</i>	
N	38
<i>Female</i>	11
<i>Male</i>	27
Age (years) (± SD)	57.9 ± 11.8
Race/Ethnicity	
<i>African American</i>	16
<i>Caucasian</i>	21
<i>Hispanic</i>	1
<i>Education (years)</i>	14
Table 1	

Table 2				
<i>Paired samples t-test results for change in HADS and fitness T1 to T2</i>				
Variable	Time 1 Mean	Time 2 Mean	p value	t value
<i>Distress (HADS total)</i>	11.23	8.87	.002	3.36
<i>Anxiety</i>	6.86	5.54	.018	2.49
<i>Depression</i>	4.37	3.89	.571	0.57
<i>60ft WT performance (seconds)</i>	19.43	18.72	.184	1.35
<i>6MWT performance (meters)</i>	426.31	455.01	<.001	4.76
<i>Pre-60ft WT RPE</i>	7.23	6.39	.014	2.59
<i>Pre-6MWT RPE</i>	6.90	6.32	.026	2.33
Table 2 T-test Table				

Table 3***Pearson correlations between pre-60ft WT and T1 HADS***

	Time 1 pre-60ft WT RPE	Time 1 pre-60ft WT Fatigue	Time 1 pre-60ft WT Shortness of Breath	Pre-60ft WT RPE Change	Pre-60ft WT Fatigue Change	Pre-60ft WT Shortness of Breath Change
<i>Time 1 Distress</i>	.29**	.15	.15	.36**	.18	.17
<i>Time 1 Anxiety</i>	.21	.04	.11	.31*	.09	.16
<i>Time 1 Depression</i>	.29**	.23	.12	.33**	.26	.13

Notes: **p < .05, *p < .10

Table 3 Pearson Correlation Table

References

- American Heart Association (2013). Facts - Cardiac Rehabilitation - Putting More Patients on the Road to Recovery. Retrieved from http://www.heart.org/idc/groups/heart-public/@wcm/@adv/documents/downloadable/ucm_449722.pdf
- American Heart Association. (2011). What is Cardiovascular Disease (Heart Disease)? Retrieved from http://www.heart.org/HEARTORG/Caregiver/Resources/WhatisCardiovascularDisease/What-is-Cardiovascular-Disease_UCM_301852_Article.jsp
- American Heart Association. (2011). What is Cardiac Rehabilitation? Retrieved from http://www.heart.org/HEARTORG/Conditions/More/CardiacRehab/What-is-Cardiac-Rehabilitation_UCM_307049_Article.jsp
- Barnum, D. D. (2001, January). Patterns and predictors of emotional responses during cardiac rehabilitation. Dissertation Abstracts International, 61.
- Centers for Disease Control and Prevention. (2013). Heart Disease Facts. Retrieved from <http://www.cdc.gov/heartdisease/facts.htm>
- Centers for Disease Control and Prevention. (2012). Other Related Conditions. Retrieved from http://www.cdc.gov/heartdisease/other_conditions.htm
- Centers for Disease Control and Prevention. (2009). Heart Disease Heredity. Retrieved from <http://www.cdc.gov/heartdisease/heredity.htm>
- Centers for Disease Control and Prevention. (2009). Heart Disease Behavior. Retrieved from <http://www.cdc.gov/heartdisease/behavior.htm>
- Centers for Disease Control and Prevention. (2011). Mental Health Basics. Retrieved from <http://www.cdc.gov/mentalhealth/basics.htm>

Centers for Disease Control and Prevention (2011). Perceived Exertion (Borg Rating of Perceived Exertion Scale). Retrieved from <http://www.cdc.gov/physicalactivity/everyone/measuring/exertion.html>

Christensen, A. J., Moran, P. J., & Wiebe, J. S. (1999). Assessment of irrational health beliefs: Relation to health practices and medical regimen adherence. *Health Psychology: Official Journal of the Division of Health Psychology, American Psychological Association*, 18(2), 169-176.

Doe, V. H. (2010). Effects of cardiac rehabilitation in depressed versus non-depressed individuals on fitness, depression, and perceived exertion. *Dissertation Abstracts International: Section B: The Sciences and Engineering*, 71(2), 964.

Franks, M. M., Parris Stephens, M. A., Rook, K. S., Franklin, B. A., Keteyian, S. J., & Artinian, N. T. (2006). Spouses' provision of health-related support and control to patients participating in cardiac rehabilitation. *Journal of Family Psychology*, 20(2).

Herber, O. R., Jones, M. C., Smith, K., & Johnston, D. W. (2012). Assessing acute coronary syndrome patients' cardiac-related beliefs, motivation and mood over time to predict non-attendance at cardiac rehabilitation. *Journal Of Advanced Nursing*, 68(12), 2778-2788.

Levy B, Ashman O, & Dror I. (1999). To be or not to be: The effects of aging stereotypes on the will to live. *Omega*, 40(3), 1999-2000.

Million Hearts. (2013). About Heart Disease & Stroke. Retrieved from <http://millionhearts.hhs.gov/abouthds/risk-factors.html#hdAge>

- Puetz, T., Beasman, K., & O'Connor, P. (2006). The effect of cardiac rehabilitation exercise programs on feelings of energy and fatigue: a meta-analysis of research from 1945 to 2005. *European Journal Of Cardiovascular Prevention And Rehabilitation: Official Journal Of The European Society Of Cardiology, Working Groups On Epidemiology & Prevention And Cardiac Rehabilitation And Exercise Physiology*, 13(6), 886-893.
- Retzlaff, B. M., Dowdy, A. A., Walden, C. E., Bovbjerg, V. E., & Knopp, R. H. (1997). The northwest lipid research clinic fat intake scale: Validation and utility. *American Journal of Public Health*, 87(2), 181-185.
- Sallis, J. F., Haskell, W. L., Wood, P. D., Fortmann, S. P., Rogers, T., Blair, S. N., & Paffenbarger, R. S., J. (1985). Physical activity assessment methodology in the five-city project. *American Journal of Epidemiology*, 121(1), 91-106.
- Snyder, C. R., Simpson, S. C., Ybasco, F. C., Borders, T. F., Babyak, M. A., & Higgins, R. (1996). Development and validation of the state hope scale. *Journal of Personality and Social Psychology*, 70(2), 321-335.
- Yohannes, A., Doherty, P., Bundy, C., & Yalfani, A. (2010). The long-term benefits of cardiac rehabilitation on depression, anxiety, physical activity and quality of life. *Journal Of Clinical Nursing*, 19(19-20), 2806-2813. doi:10.1111/j.1365-2702.2010.03313.x
- Zigmond, A. S., & Snaith, R. P. (1983). The Hospital Anxiety and Depression Scale. *Acta Psychiatrica Scandinavica*, 67(6), 361-370.